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Tectonic causes of uneven cementation zones distribution in the bituminous sandstones productive part of the Sheshminsky horizon of the South Tatar arch

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Abstract

© 2018 Neftyanoe Khozyaistvo. All rights reserved. The exploitation of bitumen deposits with the using thermal methods as deposits of high-viscosity oils requires a detailed lithological study of the enclosing rocks. The article presents the results of research of bituminous sands and sandstones of the Sheshminsky horizon of the Ufimian tier of the Permian system. Bituminous sandstones are cross-bedded, finely-medium-grained, polymictic, belong to the greywack group. They lie at shallow depths - from the surface to 400 m. Bitumen deposits have a lenticular form and lie in the form of a layer and associated with positive local structures in the Ufimian sediments. The article deals with the issues related to the distribution of cementation zones in sands and sandstones of bituminous deposits, mechanisms for the formation of carbonate cement and the reasons for its heterogeneity in the profile. Taking into account the nature of the cement, degree of cementation and bitumen saturation, we have identified three groups - tar sands, bituminous sandstones and bitumless sandstones. In the occurrence of lithotypes is noted vertical zoning. The horizons of loose bituminous sands tend to the upper sections of the deposit, and strong cemented sandstones predominate in its lower areas. Lithological zoning could arise as a result of cementation of rocks below the zone of water-oil contact. Its causes may be associated with tectonic restructuring during the formation of the bitumen deposit. To clarify the reasons for the irregular lithological heterogeneity of the Sheshminsky horizon, we reconstructed the conditions of sedimentation of the Sheshminsky bitum-containing sandstones. A paleotectonic analysis of the current section at the boundary of the Ufimian and Kazanian deposits was carried out using the method of paleotectonic profiles. The obtained conclusions indicate that the formation of bitumen-containing structures occurred for a long time under the influence of vertical tectonic movements. The displacement of the cementation zones caused the lithological heterogeneity of productive horizons.

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Keywords

Bitumen, Cementation zones, Deposit, Paleotectonic analysis, Sands and sandstones

References

[1] Produktivnye bituminoznye tolshchi permskikh otlozheniy Melekesskoy vpadiny i Tatarskogo svoda (The productive bituminous strata of the Permian deposits of the Melekess Basin and the Tatar Arch): edited by Troepol'skiy V.I., Lebedev N.P., Kazan': Publ. of Kazan University, 1982, 103 p.

[2] Metodicheskoe rukovodstvo po poiskam, otsenke i razvedke mestorozhdeniy tverdykh nerudnykh poleznykh iskopaemykh Respubliki Tatarstan (Methodical guidance on prospecting, evaluation and exploration of deposits of solid non-metallic minerals of the Republic of Tatarstan), Part 1: edited by Khayretdinov F.M., Fayzullin R.M., Kazan': Publ. of Kazan University, 1999, 256 z.

[3] Uspenskiy B.V., Valeeva I.F., Geologiya mestorozhdeniy prirodnykh bitumov Respubliki Tatarstan (Geology of natural bitumen deposits of the Republic of Tatarstan), Kazan': Gart Publ., 2008, 349 p.

[4] Muslimov R.Kh, Romanov G.V., Kayukova G.P. et al., Kompleksnoe osvoenie tyazhelykh neftey i prirodnykh bitumov permskoy sistemy Respubliki Tatarstan (Integrated development of heavy oil and natural bitumen of Permian system of the Republic of Tatarstan), Kazan': Fen Publ., 2012, 396 p.

[5] Khisamov R.S., Analysis of efficiency of steam-gravity reco very technology for development of heavy oil reserves (In Russ.), Neftyanoe khozyaystvo = Oil Industry, 2014, no. 7, pp. 24-27.

[6] Khasanov R.R., Mullakaev A.I., Dusmanov E.N., The structure of sandstones in productive horizons of the permian bituminous deposits of Tatarstan (Russia) (In Russ.), Uchenye zapiski Kazanskogo universiteta. Seriya Estestvennye nauki, 2017, V. 159, no. 1, pp. 164-173.

[7] Nurgalieva N.G., Ikhsanov N.A., Nurgaliev D.K., Dautov A.N., Facial characteristics of the Ufimian bituminous sediments (In Russ.), Neftyanoe khozyaystvo = Oil Industry, 2016, no. 4, pp. 72-75.

[8] Mullakaev A.I, Khasanov R.R., Galiullin B.M., Mineralogy of sandstones and localization of oil matter in productive horizons of high-viscosity oil in permian deposits of the Volga-Ural region (Russia), Proceedings of 17th International Multidisciplinary Scientific GeoConference SGEM 2017, SGEM2017 Conference Proceedings, 29 June - 5 July 2017, V. 17, Issue 11, pp. 353-358, DOI:10.5593/sgem2017/11/SO1.045.

[9] Sakhibgareev R.S., Vtorichnye izmeneniya kollektorov v protsesse formirovaniya i razrusheniya neftyanykh zalezhey (Secondary changes in reservoirs in the formation and destruction of oil fields), Moscow: Nedra Publ., 1989, 260 p.

[10] Neyman V.B., Teoriya i metodika paleotektonicheskogo analiza (Theory and methodology of paleotectonic analysis), Moscow: Nedra Publ., 1984, 80 p.